

## Twelve Ground Beetles New to Virginia or the District of Columbia and an Annotated Checklist of the Geadephaga (Coleoptera, Adephaga) from the George Washington Memorial Parkway

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### ABSTRACT

One-hundred eighty-four species in 70 genera of geadephagan beetles (183 carabids and one rhyssodid) were documented during a nine-year field survey of a national park site (George Washington Memorial Parkway) that spans parts of Fairfax and Arlington counties and the City of Alexandria in Virginia, and the District of Columbia. The capture of *Elaphropus quadrisignatus* (Duftschmid) represents the second record for the New World. Seven species, *E. quadrisignatus*, *Harpalus rubripes* (Duftschmid), *Microlestes pusio* (LeConte), *Platynus opaculus* LeConte, *Pterostichus permundus* (Say), *P. sculptus* LeConte, and *Scarites vicinus* Chaudoir are documented for the first time from the Commonwealth. Seven species, *Anisodactylus dulcicollis* (LaFerté-Sénéctère), *Elaphropus anceps* (LeConte), *E. saturatus* (Casey), *Oodes americanus* Dejean, *P. permundus*, *S. vicinus*, and *Tachys potomaca* (Erwin) are documented for the first time from the District of Columbia. The study increases the number of geadephagan beetles known from the Potomac River Gorge to 255 species and the number from Virginia to 543 taxa. Hand picking and Malaise traps proved to be the most successful capture methods of the eight methods employed during the survey. Periods of adult activity, based on dates of capture, are given for each species. Relative abundance is noted for each species based on the number of captures. Notes on morphological characteristics and habitats are given for some species. *Phloeoxena signata* (Dejean) was the only species found in the study area that appears on the state list of rare animals of Virginia. Eight species are adventive to North America.

*Key words:* Carabidae, Coleoptera, District of Columbia, Geadephaga, ground beetles, national park, new state records, Potomac River Gorge, Virginia.

### INTRODUCTION

The Geadephaga (Coleoptera, Adephaga), which includes the families Trachypachidae, Rhyssodidae, and Carabidae (including cicindelinae) is a large group of primarily polyphagous beetles with estimates of nearly 40,000 species worldwide (Erwin, 1991). The carabids, or ground beetles, represent the vast majority of the group with more than 33,905 described species, and 2,635 species and subspecies inhabiting Nearctic North America (Ball & Bousquet, 2001). The rhyssodids, or

wrinkled bark beetles contain 355 species, and the trachypachids, or false ground beetles, are represented by only six species found in Chile, northern Eurasia, and the western United States and Canada (Bousquet, 2012).

Even within the Carabidae there is high diversity in body form and habitat preferences. Body lengths range from just over 1 mm to nearly 100 mm. Some species are blind whereas others have large eyes. Some possess well developed wings and are strong fliers. Others are flightless and have short or rudimentary wings, and

some are wing-polymorphic. Carabids occupy nearly every conceivable niche. Some are strong diggers and can be found in subsurface habitats, some are cave specialists, and others are primarily arboreal. They are found in swamps and marshes, upland forests and deserts, from below sea level to 5,300 m elevation (Mani, 1968). It is not uncommon to find carabids in human habitations. Many species overwinter as adults. Adults live two to four years and the life cycle is completed within one year. Pupation occurs in the ground (Ball & Bousquet, 2001). Carabid fossils are common in Quaternary age deposits, many representing extant species, and have been found in sediments as old as the late Tertiary Period (Matthews, 1979; Matthews & Telka, 1997).

The family is popular among collectors worldwide, no less so in Virginia. The first attempt to compile a list of Geadephaga from the Commonwealth was made by Bousquet & Laroche (1993), who attributed 446 carabid taxa and four rhyssodid species to Virginia. Davidson (1995) solidified this list and increased the total to 453 carabid species. Anderson et al. (1995) raised the species tally to 458 species. Knisley & Schultz (1997) added three *Cicindela* bringing the total to 461 species. Hoffman (1997) added one species, *Phloeoxena signata* (Dejean), to the total. Hoffman (1998) added *Pterostichus pensylvanicus* LeConte and deleted *Pterostichus adstrictus* Eschscholtz from the carabid fauna of the Commonwealth. Hoffman & Roble (2000) and Hoffman et al. (2006) added 44 carabid species to the fauna of the Commonwealth, raising the total to 506 species. Evans (2009) added the European exotic *Calosoma sycophanta* (Linnaeus), and Hoffman (2010) added four other carabids. With the publication of Bousquet (2012) the number of Geadephaga recorded from the Commonwealth reached 531 taxa, giving Virginia (tied with Ontario) the fifth most species-rich geadephagan fauna of all political regions in the United States and Canada. Roble & Hoffman (2012) broke the tie with Ontario by the discovery of three carabids and one rhyssodid beetle new to the Virginia fauna, bringing the total to 535 taxa (528 species and seven subspecies), including 530 carabids and five rhyssodids. Roble & Hoffman (2012) also provided a table summarizing the citations for the various additions and deletions to the Virginian geadephagan list since the records added by Hoffman et al. (2006).

This study sought to add to the distributional knowledge of the geadephagan fauna by compiling records, documented with a voucher specimen, from a national park in northern Virginia, George Washington Memorial Parkway (GWMP), and to determine whether any federally or state listed rare, threatened or

endangered Geadephaga occur within the study site. Currently, there are 64 Geadephaga, all carabid species, listed as rare, threatened or endangered in Virginia, the vast majority of these occurring in the genera *Pseudanophthalmus* (including 13 unnamed species) or *Cicindela* (Roble, 2013).

## STUDY SITE

The study site includes lands managed by the National Park Service as units of the George Washington Memorial Parkway (GWMP) in Virginia (Fairfax and Arlington counties and the City of Alexandria) and the District of Columbia. Park sites that received the greatest inventory effort included: in Fairfax County, Claude Moore Colonial Farm, Collingwood Picnic Area, Dyke Marsh Wildlife Refuge, Fort Hunt Park, Fort Marcy, Great Falls Park, Little Hunting Creek, Riverside Park, and Turkey Run Park; in Arlington County, Arlington Woods (at Arlington House), the Potomac Heritage Trail, and Roaches Run Waterfowl Sanctuary; in the City of Alexandria, Daingerfield Island and Jones Point Park; and in the District of Columbia, Columbia Island and Theodore Roosevelt Island. This area covers approximately 1,615 ha. Great Falls and Turkey Run parks and some of the Potomac Heritage Trail fall within the Piedmont physiographic province while all other collection sites are on the Coastal Plain. Most sites are situated along the shore of the Potomac River, and Great Falls and Turkey Run Parks and the Potomac Heritage Trail border the Potomac River Gorge, an area known for high species richness of plants and animals (Cohn, 2004). Most of the study sites are dominated by maturing, second growth, primarily upland, deciduous woodlands. More open habitats can be found in moist, narrow, herbaceous dominated bands along the shore of Potomac River, in the swamp and marsh habitats at Dyke Marsh, and in areas with managed turf grass and scattered large trees, such as Collingwood Picnic Area and Fort Hunt Park. The vascular flora of the GWMP is diverse, with more than 1,313 taxa recorded, 1,020 from Great Falls Park alone (Steury et al., 2008; Steury, 2011).

## MATERIALS AND METHODS

The number of geadephagan species documented from GWMP has grown since the first inventory targeting these families occurred in Great Falls and Turkey Run parks on three days in 2006 during the Potomac Gorge Bioblitz, which documented 30 species (Evans, 2008). The current list of 184 species is the result of approximately nine years (2004-summer 2013)

of sporadic survey effort targeting arthropods using eight collecting techniques as follows: yellow, blue, and white pan traps in Great Falls Park (two years); Malaise traps set at Dyke Marsh (five years), and Great Falls and Turkey Run parks (three years); pit-fall traps set at Dyke Marsh (five years) and at Little Hunting Creek and Great Falls and Turkey Run Parks (three years); Lindgren funnel and black-light (UV) bucket traps set at Dyke Marsh, Great Falls Park, Little Hunting Creek, and Turkey Run Park (two years); black-light shown on sheets at Great Falls and Turkey Run parks (three years); leaf litter samples from Arlington Woods, Dyke Marsh, Fort Marcy, Great Falls Park, Roaches Run Waterfowl Sanctuary, and Turkey Run Park, processed in Berlese funnels (two years); beating sheets used during the Potomac Gorge Bioblitz and sporadically at other times over two years; and collecting by hand at all sites, intensively for two years. Specimens were pinned and labeled and deposited in the collections maintained at the George Washington Memorial Parkway, Turkey Run Park Headquarters in McLean, Virginia. To determine new Virginia records we reviewed the literature associated with the citations listed in the introduction. To determine carabid records new for the Potomac River Gorge we reviewed publications by Stork (1984), Erwin (1981), Steiner & Erwin (2007), Brown (2008), Evans (2008), and Bousquet & Messer (2010). Habitat associations and notes on life history were made for specimens collected by hand or found in leaf litter samples filtered through Berlese funnels.

## RESULTS

A total of 184 geadephagan species (183 carabids and one rhyssodid) in 70 genera and 30 tribes was documented from GWMP. Seven species, *Elaphropus quadrisignatus* (Duftschmid), *Harpalus rubripes* (Duftschmid), *Microlestes pusio* (LeConte), *Platynus opaculus* LeConte, *Pterostichus permundus* (Say), *P. sculptus* LeConte, and *Scarites vicinus* Chaudoir, are reported here as new records for Virginia. A female, tentatively identified as *Loxandrus circulus* Allen, may represent an eighth species new to the Commonwealth. Seven carabids, *Anisodactylus dulcicollis* (LaFerté-Sénéctère), *Elaphropus anceps* (LeConte), *E. saturatus* (Casey), *Oodes americanus* Dejean, *P. permundus*, *S. vicinus*, and *Tachys potomaca* (Erwin), are new to the District of Columbia. These new records increase the number of carabid beetles known from Virginia to 543 taxa (however the record for *L. circulus* needs confirmation), and the number known from the District of Columbia increases to 350 taxa. With a total of 543 taxa, Virginia surpasses the total reported for North

Carolina in Bousquet (2012), giving Virginia the fourth most species-rich geadephagan fauna of all political regions in the United States and Canada. One species, *Phloeoxena signata* (Dejean), is listed as rare (S3) in Virginia (Roble, 2013). Eight species are adventive to North America.

The 184 geadephagan beetles collected from GWMP surpasses the number of species listed for some of the most studied sites in Virginia and Maryland. These sites include Quantico Marine Corps Base in adjacent Prince William and Stafford counties, Virginia, with 114 species (Hoffman, 2010), and Eastern Neck National Wildlife Refuge in Kent County, Maryland, with 80 species (Staines & Staines, 2011). Carabid inventories between 1970 and 1984 on Plimmers Island in the Potomac River Gorge of Montgomery County, Maryland, yielded 117 species (Erwin, 1981; Stork, 1984). However, 214 carabid beetle species have been collected on Plimmers Island over the last 100 years based on literature reviews and historical collections at the Smithsonian Institution, National Museum of Natural History (Brown, 2008; Erwin, 1981). Forty-nine species documented from GWMP are not known to occur on Plimmers Island. Of these, 37 were documented for the first time along the Potomac River Gorge within 6 km north or south of Plimmers Island. These species, plus three others (*Acupalpus indistinctus* Dejean, *Agonum punctiforme* [Say], and *Amphasia sericea* [Harris]) reported from the Potomac River Gorge by Evans (2008), and the addition of *Agonoleptus thoracicus* (Casey) by Bousquet & Messer (2010), bring the total number of carabids documented from the Potomac River Gorge to 255 species. The report of *Scaphinotus viduus* (Dejean) from the Potomac River Gorge by Evans (2008) is based on a misidentified specimen of *S. unicolor* (Fabricius). The records for *Trichotichnus dichrous* (Dejean) in Evans (2008), a species not seen in the Potomac River Gorge since 1932, are based on misidentified specimens of *Selenophorus opalinus* (LeConte).

Anderson et al. (1995) suggested that the high number of carabids found on Plimmers Island (many represented by just a few specimens) may be the result of random flight dispersal or downstream transport by high water, but the rediscovery of 40 of these species during this study, or by Evans (2008), suggests that most of them are rare, persistent residents of the Potomac River Gorge. Despite over nine years of sporadic survey effort using eight collecting techniques, 46 species (25%) documented by this study are represented by a single specimen. The GWMP sites with the highest species richness were Great Falls Park with 118 (26 unique to this site), Turkey Run Park with

110 (23), and Dyke Marsh Wildlife Refuge with 55 (12). Hand picking proved to be the most successful method of capturing carabid beetles during this study, yielding 134 species, including 50 captured only using this method. Comparable figures for other sampling methods were: Malaise traps, 83 (19 unique); Berlese funnels, 37 (3); black lights, 35 species (7); and pit-fall traps 31 (6). The capture of 83 species in Malaise traps suggests that these species may be strong fliers with substantial dispersal power, although these traps also captured a few species such as *Myas coracinus* (Say) and *Pterostichus tristis* (Dejean) that are not known to have flight abilities (Larochelle & Larivière, 2003). The 68 species captured only in pit-fall traps or by hand picking may indicate that these species fly less readily or not at all, although a number of infrequently collected species (*Agonum striatopunctatum* Dejean, *Anisodactylus rusticus* (Say), *Apristus latens* (LeConte), *Bembidion americanum* Dejean, *B. castor* Lindroth, *B. lacunarium* (Zimmermann), *B. levigatum* Say, *B. rolandi* Fall, *Brachinus fumans* (Fabricius), *Bradycellus atrimedeus* (Say), *Chlaenius cordicollis* Kirby, *C. impunctifrons* Say, *C. laticollis* Say, *C. sericeus* (Forster), *Cicindela tranquebarica tranquebarica* Herbst, *C. repanda repanda* Dejean, etc.), *Dyschirius sphaericollis* (Say), *Elaphrus californicus* Mannerheim, and a more common one (*Bembidion honestum* Say), that are noted as strong fliers (Larochelle & Larivière, 2003) also were captured only using these two methods. Species collected between mid-November and mid-March probably overwintered as adults, although many of these same species may overwinter as larvae as well.

Most native carabid beetle species recorded from GWMP have wide north-south ranges within their eastern United States distributions. However, a few species such as *Cyclotrachelus furtivus* (LeConte), *Microlestes pusio* (LeConte), *Scarites vicinus* Chaudoir, and *Tachys potomaca* (Erwin) are less widely distributed and restricted to, or rare within, the Mid-Atlantic area. The ten most commonly collected carabids during this study, in decreasing order of abundance, were *Stenolophus ochropezus* (Say), *Agonum punctiforme*, *Bembidion affine* Say, *Pterostichus sculptus* LeConte, *Bembidion fugax* (LeConte), *Elaphropus saturatus* (Casey), *Cicindela sexguttata* Fabricius, *Chlaenius aestivus* Say, *Agonoleptus conjunctus* (Say), and *Platynus tenuicollis* (LeConte) (see list of species for number of each species captured). The most common genera were *Bembidion* (18 species), *Agonum* and *Anisodactylus* (9), *Chlaenius* and *Elaphropus* (8), *Lebia* and *Pterostichus* (7), and *Amara* (6).

Surprising omissions from this inventory based on

their abundance and recent (circa 1975) presence on Plummers Island include the following 15 species: *Agonum rigidulum* (Casey), *A. tenue* (LeConte), *Badister notatus* Haldeman, *Calathus gregarius* (Say), *Cyclotrachelus approximatus* (LeConte), *Dicaelus ambiguus* LaFerté-Sénéctère, *D. politus* Dejean, *Dromius piceus* Dejean, *Dyschirius pilosus* LeConte, *Elaphropus incurvus* (Say), *Harpalus faunus* Say, *Olisthopus micans* LeConte, *Pterostichus caudicalis* (Say), *Stenolophus comma* (Fabricius), and *Trichotichnus vulpeculus* (Say). The absence of these species after nine years of survey effort is even more surprising considering that 73.3% are macropterous and most are strong fliers.

#### LIST OF SPECIES

Taxa are listed by family and tribe following the nomenclature and taxonomic order used by Bousquet (2012). Seven carabid species new to the Commonwealth of Virginia, and one potentially new (*Loxandrus* nr. *circulus* Allen), are marked by a dagger (†). Seven species new to the District of Columbia are marked with a double dagger (‡). Thirty-seven carabid species found along the Potomac River Gorge that were previously unrecorded from the Gorge are marked with an asterisk (\*). Forty-nine species found during this study that have not been found on Plummers Island are marked with an exclamation point (!). Eight species non-native to North America are signified with a diamond (◊). The number of specimens in the collection is indicated in parentheses after each taxon. Sites where specimens were collected are given for the District of Columbia: Columbia Island (CI), Theodore Roosevelt Island (RI); Arlington County, Virginia: Arlington Woods (AW), Potomac Heritage Trail (PH), Roaches Run Waterfowl Sanctuary (RR); City of Alexandria, Virginia: Daingerfield Island (DI), Jones Point Park (JP); and Fairfax County, Virginia: Claude Moore Colonial Farm (CM), Collingwood Picnic Area (CP), Dyke Marsh Wildlife Preserve (DM), Fort Hunt Park (FH), Fort Marcy (FM), Great Falls Park (GF), Little Hunting Creek (LH), Riverside Park (RP) and Turkey Run Park (TR). Collection methods are listed using the following abbreviations: Berlese funnel (bf); beating sheet (bs); black light (UV) traps or sheets (bl); hand picking, including the use of coverboards and splashing soil with water (hp); Lindgren funnel (lf); Malaise trap (mt); pan trap (pt); and pit-fall trap (pf). The periods of adult activity are given based on dates when live collected taxa have been documented in the park. Dates separated by a hyphen indicate that the taxon was documented on at least one day during each month within this continuum of months, whereas dates



separated by a comma represent individual observation dates. For traps set over multiple weeks, the first day of the set is used as the earliest date and the last day of the set as the latest date. Species found during this survey that have not been collected from the Potomac River Gorge within the last 70 years are indicated by the abbreviation "PRG" followed by the year of the last known collection. The habitats of taxa collected by hand or in leaf litter samples are described along with other notes on the species' biology. References to "woods" or "woodlands" mean upland deciduous forests unless indicated otherwise.

#### RHYSODIDAE CLINIDIINI

*Clinidium sculptile* (Newman)–(10); FM, GF, TR; bf, hp; 14 Apr - 16 May; PRG 1917; on tree trunk at night; under bark; leaf litter in woods.

#### CARABIDAE NEBRIINI

*Nebria lacustris* Casey–(7); GF, TR; bl, hp; 15 Sep-15 Oct; creek mouth, gravelly, silt and cobble shore; rocky, non-tidal river shore with sand and silt. Gregarious, usually in groups of three to five, or sometimes solitary, sometimes with *N. pallipes*.

*Nebria pallipes* Say–(5); TR; hp; 6 May, 15-26 Sep; rocky, non-tidal river shore with sand and silt; creek mouth with gravel, silt, and cobble; creek mouth under rock on silty sand. A subterrenal specimen was captured on 6 May 2006.

#### NOTIOPHILINI

*Notiophilus aeneus* (Herbst)–(5); GF; pf; 11 Apr-29 Jun.

*Notiophilus novemstriatus* LeConte–(2); GF, TR; hp; 20 May, 25 Sep; under coverboard at edge of woods; in gravelly soil at edge of road.

*Notiophilus semistriatus* Say–(1); GF; bs; 24 Jun; PRG 1918; captured while presumably climbing vegetation.

#### CYCHRINI

*Sphaeroderus stenostomus lecontei* Dejean–(12); AW, FM, GF, TR; bf, hp, pf; 19 Mar-15 Jul; under log in woods; leaf litter in woods.

*Scaphinotus unicolor* (Fabricius)–(4); GF; hp, pf; 11-27 Apr, 24 Jun, 21 Sep-13 Oct; PRG 1943; woods in leaf

litter. This large and brilliantly violaceous variant of *S. unicolor* known in the Potomac River region was previously assigned to subspecies *S. unicolor shoemakeri* Leng, but that name was recently synonymized with nominate *S. unicolor*.

#### CARABINI

*Calosoma scrutator* (Fabricius)–(1); FH; hp; 10 Aug; dead in pavilion.

*Carabus vinctus* (Weber)–(3); GF; hp; 17 Apr, 24 Aug; PRG 1914; under log at swamp edge; on dirt road.

#### CICINDELINI

*Cicindela punctulata punctulata* Olivier–(1); TR; hp; 5 Jul; PRG 1918; found dead in parking lot.

!*Cicindela tranquebarica tranquebarica* Herbst–(1); FH; hp; 19 Sep; edge of turf grass and dirt infield of baseball diamond.

*Cicindela sexguttata* Fabricius–(32); GF, LH, TR; hp, pf, mt; 10 Apr-30 Jul; on trail in woods.

*Cicindela repanda repanda* Dejean–(5); GF, TR; hp; 22-23 May, 11-26 Sep; sand bank along river.

#### ELAPHRINI

*Elaphrus californicus* Mannerheim–(3); TR; hp; 30 May; non-tidal river channel shore on silty sand.

*Elaphrus ruscarius* Say–(2); DM, TR; hp, mt; 19 Apr-30 May; non-tidal river channel shore on silty sand.

#### OMOPHRONINI

*Omophron americanum* Dejean–(4); TR; hp; 23-30 May, 29 Aug; non-tidal river channel shore on silty sand.

#### SCARITINI

†‡\*! *Scarites vicinus* Chaudoir–(6); GF, RI, TR; bl, hp, pf; 27 Apr-25 Jun, 30 Aug-6 Sep; sandy woodland under log; creek mouth with cobble, silt and driftwood; under log in dry woods. A teneral specimen was captured on 30 August 2012 in Great Falls Park. This species has a generally Midwestern distribution along the Mississippi River drainages reaching eastward to Ohio, Kentucky, Tennessee, and now Virginia. These records are the first for the East Coast of the United

States. The nearly identical *S. quadriceps* Chaudoir has been reported from adjacent Maryland and North Carolina, but not Virginia. Specimens from GWMP demonstrate relatively equal ratios of metasternum length to metacoxa length (measured through the same maximum longitudinal line) as is similarly observed in typical *S. vicinus* from the Midwestern United States. In typical *S. quadriceps*, the metasternum is visibly longer compared to the metacoxa.

*Scarites subterraneus* Fabricius-(7); CP, RI, TR; hp; 13 May-23 Jun, 29 Aug-11 Sep; under log in woods; creek mouth with cobble, silt, and driftwood; woodland edge under coverboard; sandy woods under log; in building.

#### CLIVININI

*Clivina dentipes* Dejean-(13); GF, PH, TR; bl, hp; 15 May-25 Sep; rocky non-tidal shore with sand and silt; non-tidal shore with sand and cobble; tidal shore on silty sand under river drift; woodland edge under coverboard.

! *Clivina pallida* Say-(1); AW; bf; 14 May; leaf litter in woods.

*Clivina americana* Dejean-(7); GF; bl, hp, mt; 17 Apr-23 Jun, 30 Aug; riverside sand and cobble; under streamside rock in woods.

*Paraclivina bipustulata* (Fabricius)-(8); AW, GF; bf, bl; 14 May-23 Jun; leaf litter in woods.

*Paraclivina ferrea* (LeConte)-(1); RI; hp; 15 May; PRG 1903; sandy tidal beach under driftwood.

\*! *Schizogenius amphibius* (Haldeman)-(6); DM, JP, RI; hp; 2 May, 20 Jun, 6 Sep; sandy tidal shore under cobble. The Potomac River Gorge specimen was found at the mouth of the gorge on the northern shore of Theodore Roosevelt Island.

*Schizogenius lineolatus* (Say)-(18); DM, GF, TR; hp; 15-30 May, 30 Aug-18 Sep; rocky non-tidal beach with sand and silt; river shore with cobble and driftwood; sandy tidal beach with cobble; sandy non-tidal beach with silt cakes and sparse vegetation.

! *Ardistomis obliquata* Putzeys-(8); DM; bf, hp, mt; 15 Apr-6 Jun; gravelly tidal shore on log in patch of *Schoenoplectus pungens* (Vahl) Palla.; in leaf litter near water.

*Semiardistomis viridis* (Say)-(25), DM, GF, PH, RI; bf,

hp, mt; 15 May-21 Oct; rocky non-tidal shore with silt and gravel; sandy tidal shore with cobble; leaf litter near water.

#### DYSCHIRIINI

*Dyschirius haemorrhoidalis* (Dejean)-(5); DM, GF, TR; bl, hp; 30 May-30 Jul, 9 Sep; river shore on sand and clay; non-tidal river channel on silty sand.

*Dyschirius sphaericollis* (Say)-(4); GF, TR; hp; 20-30 May; sandy non-tidal river shore; non-tidal river channel shore on silty sand.

#### BEMBIDIINI

*Bembidion nigrum* Say-(2); TR; hp; 29 Aug-9 Sep; PRG 1906; creek mouth on sand and clay.

*Bembidion inaequale* Say-(7); GF; TR; hp, mt; 10 Apr-20 May, 29 Aug; non-tidal shore with sand, mud and sparse vegetation; creek mouth on clay bank.

*Bembidion americanum* Dejean-(1); GF; hp; 9 Sep; PRG 1906; non-tidal river shore with cobble and drift wood.

\*! *Bembidion antiquum* Dejean-(7); DM, RI, TR; hp, mt; 12 Apr-22 May, 25 Sep; non-tidal shore with cobble, silt and driftwood; tidal sandy beach under driftwood; rocky shore with sand and silt. This species and the next two are members of the subgenus *Pseudoperlyphus*, a diagnostically challenging group when not comparing male genitalia (Maddison, 2008). It is possible that the record of *B. chalceum* Dejean from the Potomac River Gorge reported by Stork (1984) and cited by Brown (2008) was actually *B. antiquum*, which at that time was thought by some authors to be a synonym of *B. chalceum*. Our identification of *B. antiquum* is based on the combination of geographic location, body length > 6.0 mm, appendages partly pale, pronotum moderately convex with lateral borders well rounded and sinuate to base, elytra with posterior punctures non-foveate, intervals flat, weakly impressed elytral striae which tend to vanish apically, and elytral microsculpture mesh with a tendency to be stretched transversely. Dissected genitalia of two males each demonstrated the characteristic widely sinuate flagellum-like structure located inside the median lobe. This species bears close resemblance to the widespread *B. chalceum*, which was reported from the Potomac River region by Stork (1984) and Maddison (2008). However, no specimens from this inventory fit typical *B. chalceum* which is

distinguished by its smaller size (< 6.0 mm long), a pronotum that is quite convex with deep basolateral depressions, and elytra with intervals distinctly convex and with striae extended deeply to apex.

*Bembidion honestum* Say-(11); GF, TR; hp; 16-22 May, 18-26 Sep; non-tidal rocky beach with sand and silt; cobble, silt and driftwood at creek mouth; silty sand under rock at creek mouth. Identification of *B. honestum* is based here on the combination of geographic location, body length of 5.5 - 6.0 mm, pronotum being relatively broad and flat with basolateral depressions that are very shallow, pronotal luster relatively dull, elytra with posterior punctures more or less foveate, elytral striae distinctly engraved to apex, and elytral microsculpture mesh nearly isodiametric.

!*Bembidion rothfelsi* Maddison-(4); DM, RP; hp; 3-15 May; tidal sandy beach; tidal sandy cobble beach with *Schoenoplectus pungens*; tidal shore with cobble and sand. Identification of *B. rothfelsi* is based on the combination of geographic location and, in comparison to otherwise similar *B. antiquum*, the pronotum is narrower, the pronotal outline is less rounded, the reflexed pronotal margin is narrower, the elytra intervals are not as flat, and the striae, although rather thin, are less diminished apically. Consistent with the descriptions in Maddison (2008), our one male specimen was observed to have its intragenital flagellum less bent, therefore less sinuate as compared to that of *B. antiquum*.

\*!◇*Bembidion tetracolum tetracolum* Say-(1); PH; hp; 11 Sep; sandy beach under vegetation washed ashore.

*Bembidion lacunarium* (Zimmermann)-(1); TR; hp; 6 May; PRG 1905; creek edge.

*Bembidion affine* Say-(37); CP, DM, GF, RI, TR; bl, hp, mt; 31 Jan, 9 May-24 Oct; non-tidal shore with cobble, silt, and driftwood; non-tidal shore with sand and clay; tidal shore with gravel and cobble. A sub-terrenal specimen was captured on 29 August 2013.

*Bembidion impotens* Casey-(10); DM, GF, PH, RI, TR; hp, mt; 9 Aug-11 Oct; non-tidal river shore with cobble and driftwood; sandy tidal shore; creek mouth with sand and clay.

*Bembidion castor* Lindroth-(8); GF, PH, TR; hp; 20 May, 29 Aug-25 Sep; moist sandy shore under vegetation; non-tidal river shore with cobble and driftwood; non-tidal rocky shore with sand and silt;

non-tidal shore with sand, mud, and sparse vegetation.

*Bembidion patruelle* Dejean-(3); DM, TR; hp, mt; 6-20 Jun, 9-26 Sep; creek mouth with sand and clay; silty sandy shore under rock.

*Bembidion rapidum* (LeConte)-(6); DM, TR; mt; 8-23 May, 16 Jul-11 Oct.

\*!*Bembidion frontale* (LeConte)-(1); TR; mt; 1-22 May.

*Bembidion levigatum* Say-(1); PH; hp; 17 June; tidal shore with silty sand and clay.

*Bembidion variegatum* Say-(6); GF, TR; hp; 20-23 May; non-tidal shore with sand, mud and sparse vegetation; muddy shore of river channel.

*Bembidion fugax* (LeConte)-(34); GF, RI, TR; hp, mt; 10 Apr-23 May, 9-18 Sep; rocky shore with sand and silt; non-tidal shore with cobble, sand, and driftwood; non-tidal river shore with sand and clay; sandy tidal beach under driftwood.

\*!*Bembidion rolandi* Fall-(5); GF; hp; 16 May, 18 Sep; non-tidal beach under rock on gravelly, silty, sand; creek mouth with cobble and driftwood.

*Mioptachys flavicauda* (Say)-(24); AW, DM, GF, TR; bf, bs, mt; 14 Apr-23 May, 27-29 Aug; riverside prairie; leaf litter in woods. Considering the relatively large number of captures of this minute (1.5-1.8 mm) beetle, it is probably very common in the study area.

*Tachyta inornata* (Say)-(11); AW, GF, TR; bf, hp, mt; 10-30 Apr, 15 Dec; PRG 1905; under loose bark of fallen *Liriodendron tulipifera* L.; leaf litter in woods.

‡\*!*Elaphropus anceps* (LeConte)-(12); AW, GF, JP, RI, TR; bf, hp; 15 Apr-30 May, 29 Aug-6 Sep; tidal shore on pure sand under log; tidal shore under rock on sand; non-tidal shore on silty sand; leaf litter in woods. This species has been documented from Virginia and Maryland, along with 32 other states, so it was to be expected in the District of Columbia.

!*Elaphropus capax* (LeConte)-(1); RP; hp; 9 May; sandy tidal beach under cobble.

‡*Elaphropus saturatus* (Casey)-(34); DM, JP, PH, RI, RP, TR; hp, mt; 12 Apr-20 Jun, 30 Aug-19 Sep; tidal shore on gravel bar under rock; tidal shore under cobble; creek mouth with cobble, silt, and driftwood;

tidal, sandy beach with cobble and *Schoenoplectus pungens*; tidal shore on silty sand under driftwood; rocky non-tidal shore with sand and silt. On 9 May 2012, at least 14 *E. saturatus* were found under a 30 x 30 cm rock on a cobble bar at Jones Point Park approximately 10 m from the tidal shore. As the tide ebbed, the cobble bar and rock, submerged at high tide, became exposed but were still entirely surrounded by water. The *E. saturatus* found under the rock on this cobble bar must have survived tidal submersion for at least six hours. Laroche & Larivière (2003) list the habitats of this species as banks of rivers and brooks, drier zone of lake shores, borders of marshes, cultivated fields, and open ground with moderately moist substrates and sparse vegetation, but make no mention of the species' adaptation to long periods of submersion. This species was first documented from Virginia by Hoffman (2010). See *E. vivax* for a discussion on resolving the occasional difficulty in distinguishing that species from *E. saturatus* on the basis of coloration.

*Elaphropus tripunctatus* (Say)–(15); GF, PH, RI, TR; hp, mt; 1-22 May, 9-19 Sep; PRG 1907; non-tidal rocky beach with sand and silt; river shore with cobble and driftwood; sandy tidal beach under driftwood.

*Elaphropus vernicatus* (Casey)–(2); PH; hp; 17 Apr, 17 Jun; sandy, silty, tidal shore under sticks.

*Elaphropus vivax* (LeConte)–(15); GF, TR; hp; 22 May-26 Jun, 29 Aug-25 Sep; non-tidal sandy river shore; non-tidal river shore on sand and clay; muddy shore under leaf litter; non-tidal shore with cobble, silt, and driftwood. Typical *E. vivax* is uniformly yellowish-red and therefore readily distinguished in most cases from darker reddish-brown *E. saturatus* by noting the coloration of their forebodies, antennae, and palps (Bousquet, 2010). However, some individuals of *E. saturatus* from GWMP had those body parts sufficiently lighter in color so as to cause confusion with otherwise similar *E. vivax*. A more reliable character for distinguishing these species is the degree of surface microsculpture (mesh) on the posterior half of the frons and laterally on the subapical abdominal sterna. Unlike *E. saturatus*, in which the mesh is distinct, in *E. vivax* the mesh is obscure to absent on the posterior frons and on the subapical sterna, thereby rendering those areas very shiny under microscopy. A teneral and two sub-teneral specimens were captured on 29 August 2013.

*Elaphropus xanthopus* (Dejean)–(19); AW, DI, DM, FH, GF, JP, PH, RI, TR; bf, bl, hp, mt, pt; 10 Apr-26

Sep; moist upland depression under log; rocky non-tidal shore with gravel, silt, and sand; creek mouth with cobble, silt, and drift wood; riverside prairie; under thin soil over concrete, leaf litter in woods. Surprisingly, this common beetle was not attributed to the Virginia fauna until Hoffman et al. (2006) noted it. The first records for Fairfax County were documented by Evans (2008). We report the first records for Arlington County and the City of Alexandria. This is the only *Elaphropus* species that was found at sites away from river shores, with the exception of two specimens of *E. anceps*. It is reported from Plummers Island (Brown, 2008) under the synonym *E. levipes* (Casey).

†\*!◇*Elaphropus quadrisignatus* (Duftschmid)–(1); PH; hp; 17 Jun; tidal shore on silty sand under debris. This is the first record for Virginia and only the second known capture in the New World. The first capture occurred on 23 June 2010 at a UV light in Burlington County, New Jersey. The corresponding habitus images and collection data were posted on the website BugGuide.net by collector Tim Moyer. That specimen was examined, determined, and retained by P.W. Messer, who subsequently received species corroboration from authority Terry Erwin based on his recognition of the distinct habitus images (pers. comm. 27 June 2012). This species is not listed in the North American catalogue by Bousquet (2012). According to Löbl & Smetana (2003), *E. quadrisignatus* has been documented from Europe, west to Portugal and the United Kingdom, north to Poland, east to Turkey and Cyprus, south to Macedonia and Italy and in northern Africa (Algeria and Morocco).

*Polyderis laeva* (Say)–(7); DM, GF, PH, RR; bf; 15 Apr, 19-21 Oct; PRG 1923; leaf litter in woods. This is the smallest carabid beetle collected at GWMP, measuring only 1.2 to 1.5 mm.

*Tachys oblitus* Casey–(21); AW, DM, GF, RP; bf, hp, mt; 11 May-30 Aug; 19-21 Oct; leaf litter near water; leaf litter in woods; non-tidal river shore with sand and cobble; sandy tidal shore under driftwood. The three specimens from Great Falls Park represent the second time this species has been found in the Potomac River Gorge, the first being from Plummers Island in 1960. These are the first records for Fairfax and Arlington counties based on the Virginia range documented by Roble & Hoffman (2012).

‡*Tachys potomaca* (Erwin)–(26); DM, GF, PH, RI, TR; bf, hp; 15 Apr-15 May; 6 Sep-21 Oct; leaf litter near water; leaf litter in woods; sandy tidal beach under log; tidal beach on sand and silt under moist leaf litter.

Described as a new species in 1981, the type locality for this brachypterous carabid is in the Potomac River Gorge. Its known range is restricted to five Mid-Atlantic states between Massachusetts and North Carolina with an inland station reported from Ohio. The District of Columbia is added here to the known range of the species.

*Tachys proximus* (Say)–(1); DM; mt; 20 Jun-2 Jul.

*Tachys scitulus* LeConte–(18); DM, GF, PH, TR; bf, bl, hp, mt; 15 Apr-26 Sep; tidal shore on silty sand under driftwood; muddy non-tidal shore under leaf litter; creek mouth with cobble silt and driftwood; leaf litter near water. This wide ranging species was first recorded for Virginia by Hoffman et al. (2006). Evans (2008) documented the first record for Fairfax County and the Dyke Marsh specimens represent the second Coastal Plain records from Virginia (Hoffman, 2010). We add Arlington County to its known distribution in Virginia. A teneral specimen was captured in Turkey Run Park on 25 September 2012.

#### PATROBINI

*Patrobus longicornis* (Say)–(5); JP, PH, TR; hp; 9 May-26 Jun, 11-26 Sep; tidal shore, silty sand under driftwood; creek mouth, silty sand under rock; woods inside rotting log.

#### BRACHININI

*Brachinus fumans* (Fabricius)–(1); TR; hp; 9 Sep; PRG 1908; under coverboard at edge of woods.

#### ABACETINI

\*!*Loxandrus brevicollis* (LeConte)–(2); GF; hp, mt; 24 Apr-18 Jun; in moist leaf litter at edge of vernal pool.

†*Loxandrus* nr. *circulus* Allen–(1♀); GF; mt; 1-20 May. Geographically, *L. circulus* is the most probable of the five species belonging to a subset of the *erraticus* group that ends in couplet #74 for females in the taxonomic key by Allen (1972). Ranges for the other four species (*L. cincinnati* Casey, *L. minor* (Chaudoir), *L. nitidulus* (LeConte), *L. robustus* Allen) are relatively far removed from Virginia. Although *L. circulus* has not been previously recorded from Virginia, it is known from adjacent Plummers Island, Maryland. Globally, *L. circulus* is known only from a few localities in Maryland, the District of Columbia, northern Ohio, Mississippi, and Alabama (Bousquet, 2012).

\*!*Loxandrus vulneratus* Casey–(3); CM, GF; bl, hp; 11 Mar, 25 May; under rock near vernal pool.

\*!*Loxandrus rectus* (Say)–(1); GF; bl; 12 Jul.

#### PTEROSTICHINI

*Poecilus lucublandus* (Say)–(15); CM, CP, FH, GF; hp, pf, mt; 8 Apr-29 Jun, 30 Aug-11 Nov; swamp under log; woodland edge under log; turf grass; parking lot; in building.

*Gastrellarius honestus* (Say)–(2); TR; hp; 14 Apr, 15 Dec; PRG 1922; under bark of fallen *Fagus grandifolia* Ehrhart.

*Myas coracinus* (Say)–(8); GF, LH, TR; hp, pf, mt; 6 Jun-17 Jul, 23 Sep-14 Nov; PRG 1923; rich woods under log; in building.

*Pterostichus trinarius* (Casey)–(18); GF, TR; hp, pf; 11 Apr-7 Jul, 23 Sep-13 Oct; under bark; on trail in woods.

*Pterostichus coracinus* (Newman)–(2); GF, TR; pf; 16-30 Jun, 23 Sep-13 Oct; PRG 1919. The report of this species by Evans (2008) from the Gorge is based on a misidentified *P. stygicus*.

*Pterostichus stygicus* (Say)–(19); FM, GF, LH, PH, TR; bf, hp; 16 May-23 Jun, 29 Aug-25 Sep; tidal shore, silty sand under driftwood; turf grass under board near woods; under coverboard at edge of woods; rocky non-tidal shore with sand and silt; swamp under log; dry vernal pool under log; rich woods under log; leaf litter in woods.

\*!*Pterostichus atratus* (Newman)–(3); GF; pf; 23 Sep-20 Oct.

††\*!*Pterostichus permundus* (Say)–(7); GF, PH, RI, TR; hp, pf; 30 Aug-23 Oct; tidal shore under driftwood on sand, silt, and wet leaf litter; tidal shore under log on pure sand; turf grass under board near woods; in building. The known range for *P. permundus* is from southern Ontario and northern Michigan to southeastern South Dakota, northeastern Texas, and northeastern Florida (Bousquet, 2012).

†\*!*Pterostichus sculptus* LeConte–(36); CP, DM, FH, GF, JP; bf, hp; 9 May-2 Jun, 19 Sep-11 Nov; under rock at edge of woods; under log in turf grass; tidal shore under driftwood; leaf litter near water; crossing stone road; under leaf litter on parking lot curb; in building. The documented range for *P. sculptus* is from



New York to Iowa, south to Arkansas, Alabama, Georgia and South Carolina (Bousquet, 2012). Despite its status as a new state record, this is the most common large carabid found in the study area. The species was listed as nocturnal by Laroche & Larivière (2003), but one specimen at Dyke Marsh was found crossing a stone road at midday. In September, a group of nine *P. sculptus* was found under a rock measuring 30 x 35 cm. Adult lengths for this species have been listed as 15 - 17 mm (Downie & Arnett, 1996; Ciegler, 2000), but five smaller specimens (12.5 to 13.5 mm) were found in the study area. A subteneral specimen was found in Great Falls Park on 20 May, 2013.

*Pterostichus tristis* (Dejean)–(3); GF, TR; hp, mt, pf; 19 Apr-21 May, 7-16 Jul; in building.

*Cyclotrachelus sigillatus* (Say)–(7); TR; hp, pf; 2 Jun-29 Aug; PRG 1909; under coverboard at edge of woods; under log in rich woods; in building.

\*!*Cyclotrachelus furtivus* (LeConte)–(12); FH, GF, TR; hp, pf; 2 Jun-29 Aug; under coverboard at edge of woods; rich woods under log; in building. The known range of this large, brachypterous carabid extends from central Virginia north to New Jersey and west to West Virginia.

#### ZABRINI

\*!*Amara pennsylvanica* Hayward–(1); GF; hp; 1 May; near pond.

*Amara exarata* Dejean–(1); TR; hp; 13 Sep; PRG 1919; woodland edge under coverboard.

*Amara impuncticollis* (Say)–(6); CM, GF, TR; bf, hp, mt; 7 Mar-22 May; under rock in woods, under bark pile in woods; in leaf litter.

◇*Amara aenea* (DeGeer)–(10); AH, CP, DM, GF, PH, TR; bf, hp, pf; 20 Feb-24 Jun; on stone road; in turf grass at edge of parking lot; in leaf litter.

◇*Amara anthobia* Villa & Villa–(9); CP, DI, FM, JP, TR; hp; 7 Mar-11 Jun, 10 Nov; turf grass at edge of parking lot; in parking lot; moist depression under log, under rock in woods, on sidewalk. On the East Coast, this introduced European beetle has been recorded only in New York, Maryland, and Virginia.

◇*Amara familiaris* (Duftschmid)–(5); DM, GF, JP, PH; hp, mt; 8-28 Apr, 20 Jun-2 Jul; on sidewalk; river shore on sand and silt under sticks; under rock at woodland

edge.

#### OODINI

!*Lachnocrepis parallela* (Say)–(3); DM; mt; 19-28 Apr, 29 Aug-10 Oct.

*Oodes amaroides* Dejean–(3); DM, GF, TR; bf, bl, hp; 15 Apr-25 May; muddy shore of river channel; leaf litter near water.

‡\*!*Oodes americanus* Dejean–(2); RI; hp; 15 May; under driftwood at upper edge of sand beach. Based on the range given for this species in Bousquet (2012), this capture likely represents the northernmost known record. This species is tentatively separated externally from very similar *O. fluvialis* by its proportionately broader pronotal base and by its elytrial striae possibly more finely and distantly punctate. Reliable species separation, as used to determine this record, requires examination of the dissected aedeagus as described by Bousquet (1996).

\*!*Oodes brevis* Lindroth–(4); FM, GF, LH; bf, hp, mt, pf; 10 Apr-16 May; near pond; leaf litter in woods.

\*!*Oodes fluvialis* LeConte–(1); DM; hp; 22 Mar; under log in swamp.

*Stenocrepis cuprea* (Chaudoir)–(4); GF, TR; bl, hp; 7 Jul, 9 Sep.

#### CHLAENIINI

\*!*Chlaenius amoenus* Dejean–(5); FM, GF, TR; bf, pf; 15 Apr-7 Jul.

*Chlaenius emarginatus* Say–(1); DM; mt; 18-23 Jul.

*Chlaenius aestivus* Say–(31); DM, GF, JP, TR; bf, hp, pf, mt; 11 Apr-26 Jul, 25 Sep; under loose pine bark; under coverboard at edge of woods; tidal shore under drift wood; muddy non-tidal shore under leaf litter; rocky non-tidal shore under rock on muddy sand; leaf litter near water. This species was observed to be gregarious at dry upland sites but solitary on moist river banks.

*Chlaenius laticollis* Say–(4); TR; hp; 15 Sep; non-tidal shore with cobble, gravel, silt, and driftwood.

*Chlaenius sericeus* (Forster)–(5); GF, TR; hp; 13 Mar, 23 May, 30 Aug-26 Sep; non-tidal shore under cobble on sand, silt, and gravel; under log in woods; sandy

non-tidal beach under driftwood.

*Chlaenius cordicollis* Kirby–(4); TR; hp; 22 May, 25–26 Sep; PRG 1918; non-tidal shore with cobble, gravel, silt, and driftwood; creek mouth, silty sand under rock.

*Chlaenius impunctifrons* Say–(2); GF, TR; hp, pf; 2–16 Jun, 15 Sep; non-tidal shore on gravelly silt and cobble.

*Chlaenius tricolor tricolor* Dejean–(9); DM, FH, GF, TR; bl, hp, mt; 28 Apr–12 Jul, 15–26 Sep; under coverboard at edge of woods; creek mouth under rock on silt and gravel; riverbank under driftwood on silty sand; in building.

#### LICININI

*Dicaelus elongatus* Bonelli–(1); LH; pf; 28 Apr–18 May.

*Dicaelus dilatatus dilatatus* Say–(1); GF; pf; 11–28 Apr; PRG 1925.

*Dicaelus furvus furvus* Dejean–(2); LH; hp, pf; 3 Apr, 29 Jul–11 Aug; sandy *Fagus grandifolia* Ehrhart/*Pinus virginiana* Miller woodland under log.

*Dicaelus sculptilis intricatus* LeConte–(12); GF, TR; hp, pf; 27 Apr–30 Jun, 11 Aug–13 Sep; PRG 1905; rich woods under log; dead on sidewalk; in building.

*Badister reflexus* LeConte–(1); TR; bf; 12 May; PRG 1905; leaf litter in woods.

#### HARPALINI

*Notiobia nitidipennis* (LeConte)–(5); CP, TR; hp, mt; 11 Mar–30 Apr, 26 Jul, 29 Sep; under cover board at woodland edge; turf grass duff; under rock in open path through woods.

*Notiobia terminata* (Say)–(5); DM, GF, TR; bl, hp, mt; 23 Jun–23 Jul; PRG 1902; in building.

*Anisodactylus nigerrimus* (Dejean)–(7); GF, TR; bf, hp, pt; 15 Apr–6 May; PRG 1923; riverside prairie; open area in woods under rock; leaf litter in woods.

*Anisodactylus agricola* (Say)–(2); TR; hp, pf; 14 Apr–12 May; under bark.

*Anisodactylus melanopus* (Haldeman)–(7); CM, GF, RI, RR, TR; bf, hp, mt; 11 Mar–16 May, 25 Sep; PRG 1912; under cobble at river edge; under streamside

rock; under driftwood on sandy tidal beach; under log at edge of small agricultural field; leaf litter in woods.

‡\*!*Anisodactylus dulcicollis* (LaFerté-Sénéctère)–(13); AW, CP, DI, DM, FH, RI, TR; bf, hp, mt; 15 Apr–27 Jun, 19 Sep; rich woods under log; sandy tidal beach under driftwood; dry turf grass; turf grass under log; in spider web; leaf litter in woods, in building.

\*!*Anisodactylus ovularis* (Casey)–(1); TR; hp; 17 May; attracted to light on building.

*Anisodactylus rusticus* (Say)–(4); CI, FH, TR, GF; hp; 22 Mar–17 Apr, 26 Sep; under thin soil over concrete; on dirt road; parking lot.

\*!*Anisodactylus sanctaegrucis* (Fabricius)–(1); TR; mt; 19–30 Jun.

*Anisodactylus verticalis* (LeConte)–(4); GF, TR; hp, mt, pf; 20 May–21 Jul; under rock on sandy roadside.

\*!*Anisodactylus laetus* Dejean–(1); GF; bl; 12 Jul.

!*Amphasia sericea* (Harris)–(3); GF; bl; 23 Jun–5 Jul.

*Amphasia interstitialis* (Say)–(6); GF, PH, RR, TR; bf, hp, pf; 15 Apr–16 Jun; leaf litter in woods; muddy tidal shore under log.

*Stenolophus fuliginosus* Dejean–(1); DM; mt; 28 May–6 Jun. The specimen is a pale-legged variant.

*Stenolophus ochropezus* (Say)–(134); AW, DI, DM, FH, GF, TR; bf, bl, hp, mt; 10 Apr–23 Jul, 19–26 Sep; dry vernal pool under rock; moist upland depression under log; leaf litter in woods; leaf litter near water; creek mouth with cobble silt and driftwood; river shore with silty sand under rock; attracted to light on building. This was the most commonly collected carabid during this study, yet it was not reported from Virginia until Hoffman et al. (2006) listed it from 30 Virginia counties. Evans (2008) reported the first record for Fairfax County. We add the first records for Arlington County and the City of Alexandria.

*Stenolophus plebejus* Dejean–(4); CP, GF; hp, mt; 10 Apr–16 May, 8 Jun; PRG 1907; turf grass hanging over concrete; rocky non-tidal shore with gravel, silt and driftwood.

*Stenolophus lecontei* (Chaudoir)–(5); DM, GF, TR; bl, hp, mt; 18 Apr–31 May, 2–18 Jul, 15 Oct; sandy non-tidal beach under driftwood; attracted to light on

building.

*Agonoleptus conjunctus* (Say)–(27); CP, GF, TR; bs, hp, mt; 14 Mar–30 Jun, 18 Sep–21 Oct; rich woods under log; riverside prairie; turf grass over concrete. A subteneral specimen was collected on 2 June 2012.

\*!*Agonoleptus rotundatus* (LeConte)–(7); CP, DM, GF; hp, mt; 1–20 May, 26–29 Sep, 7 Nov; turf grass duff; non-tidal shore with sand and mud.

*Agonoleptus rotundicollis* (Haldeman)–(5); DM, TR; bf, mt; 10 Apr–20 May; PRG 1908. This species was first reported from Virginia by Bousquet (2012) without further details. Roble & Hoffman (2012) listed it from Cumberland and Rockingham counties and we add Fairfax County to the known Virginia range.

\*!*Bradycellus nigriceps* LeConte–(1); TR; mt; 19–30 Jun.

*Bradycellus rupestris* (Say)–(5); GF, PH, TR; bl, hp; mt; 1 May–23 Jun.

\*!*Bradycellus tantillus* (Dejean)–(7); DM, GF; hp, mt; 20 May–9 Aug; non-tidal shore with sand and mud. This species was first reported from Virginia by Hoffman (2010).

*Bradycellus atrimedeus* (Say)–(5); GF, PH, RI; hp; 17 Apr–17 Jun; sandy, silty, tidal shore under sticks; sandy tidal shore under driftwood; non-tidal shore with sand and mud.

*Bradycellus badipennis* (Haldeman)–(1); GF; mt; 10–30 Apr.

\*!*Acupalpus pumilus* Lindroth–(1); GF; mt; 10–30 Apr. This species was first reported for Virginia by Bousquet (2012). It is near its known southern limit in northern Virginia. It has not been recorded in Maryland but is known from West Virginia and Delaware. The species should be considered for state listing because of its rarity in Virginia.

\*!*Acupalpus indistinctus* Dejean–(3); DM, TR; hp, mt; 30 May–20 Jun; silty gravel bar in river.

*Acupalpus pauperculus* Dejean–(1); GF; bs; 24 Jun. This species was previously reported for Virginia by Hoffman et al. (2006) and Evans (2008; based on the specimen cited here).

*Acupalpus testaceus* Dejean–(5); GF, TR; bl, hp, mt; 20 May–23 Jun; non-tidal shore with cobble, silt, and driftwood; non-tidal shore on sand and mud. Previous records from the Potomac River Gorge were limited to a single capture in 1910, until Evans (2008) reported it during the Potomac Gorge Bioblitz.

*Philodes rectangulus* (Chaudoir)–(2); DM; mt; 6–20 Jun, 26 Sep. This species was first recorded for Virginia by Hoffman & Roble (2000).

*Harpalus vagans* LeConte–(7); GF, TR; hp; 19–25 Jun, 29–30 Aug; woodland edge under coverboard; turf grass near woods under board.

*Harpalus pensylvanicus* (DeGeer)–(25); CP, FH, GF, TR; bl, hp, mt; 6 Jun–26 Oct; under coverboard at edge of woods; turf grass under board; rich woods under log; in building. Evans (2008) recorded the first Potomac River Gorge record of this common, gregarious beetle since 1932. It was observed mating in Fort Hunt Park on 19 September 2012.

\*!*Harpalus affinis* (Schrank)–(6); DM, FH, RI; hp, mt; 8–23 May, 19–23 Sep; in building; in turf grass; in spider web; on concrete plaza.

†\*!*Harpalus rubripes* (Duftschmid)–(1); GF; hp; 20 May; under leaf litter on parking lot curb. This is the southernmost station known in North America for this European beetle. The first North American specimen was collected in New Hampshire in 1981. It has since been documented from Nova Scotia to eastern Pennsylvania (Bousquet, 2012), and now northern Virginia.

*Selenophorus opalinus* (LeConte)–(16); DM, GF; bf, bl, hp, mt; 14 Apr–7 Sep; PRG 1907; under oak leaf litter in open gap on rock outcrop above river; leaf litter near water.

*Trichotichnus autumnalis* (Say)–(20); AW, DM, FM, GF, PH, RI, TR; bf, hp, lf, mt; 10 Apr–20 May, 23 Jul–8 Aug, 19–21 Oct; leaf litter in woods; sandy tidal beach under driftwood; in debris of rotting stump.

*Trichotichnus fulgens* (Csiki)–(13); CM, CP, DI, DM, FH, FM, GF, TR; bf, hp; 19 Mar–20 Jun, 30 Aug–13 Sep; under oak leaf litter on rock outcrop above river; woodland edge under log; under rock in woods; dry turf grass; in building.

*Cratacanthus dubius* (Palisot de Beauvois)–(6); FH; hp; 27 Jun, 19 Sep; under tuft of *Digitaria sanguinalis* (L.) Scop. in dirt infield of baseball diamond; in building.

## SPHODRINI

\*!*Calathus opaculus* LeConte–(1); GF; bs; 14 Apr; riverside prairie.

*Synuchus impunctatus* (Say)–(1); TR; pf; 2-16 Jun; PRG 1905.

## PLATYNINI

*Rhadine caudata* (LeConte)–(10); GF, TR; hp, pf; 11 Apr-6 Oct; PRG 1919; under coverboard at edge of woods; in building.

*Agonum ferreum* Haldeman–(11); DM, GF, PH, TR; bf, hp, mt; 17 Apr-26 Jun; rich woods under log; leaf litter near pond; under rock at trail edge in woods; creek mouth with rock, cobble, sand, and silt; muddy tidal shore under vegetative debris.

*Agonum excavatum* Dejean–(5); GF, TR; hp, mt; 10 Apr-30 May, 29 Aug; sandy non-tidal beach with silt cakes and sparse vegetation.

*Agonum extensicolle* (Say)–(20); CP, DM, GF, JP, RI, RP, TR; hp, mt, pf; 10 Apr-23 Jun, 6-25 Sep; sandy cobble tidal beach with *Schoenoplectus*; sandy tidal shore; tidal shore under log; rocky non-tidal shore; rocky non-tidal shore with sand and silt; turf grass under log.

*Agonum melanarium* Dejean–(4); GF; mt, pf; 10-30 Apr, 24 Aug-8 Sep.

\*!*Agonum moerens* Dejean–(1); GF; bl; 28 Jun.

*Agonum aeruginosum* Dejean–(1); DM; mt; 19-28 Apr.

*Agonum striatopunctatum* Dejean–(1); CP; hp; 27 May; turf grass.

*Agonum octopunctatum* (Fabricius)–(1); DM; mt; 7-19 Jul.

!*Agonum punctiforme* (Say)–(55); AW, CM, CP, DI, DM, FH, GF, PH, RI, TR; bf, hp, mt; 11 Mar-30 Jun, 27 Aug-21 Nov; woodland edge under coverboard; woods under log along trail; rocky non-tidal shore on

sand and silt; tidal shore, silty sand under driftwood and leaf litter; dry vernal pool under log; under thin soil over concrete; weedy turf grass under board near water; turf grass under log; under log at edge of small agricultural field; in building. A teneral specimen was captured on 11 June 2012.

*Platynus decentis* (Say)–(20); CM, FM, GF, LH, TR; bf, pf, hp; 11 Mar-29 Jun, 16-19 Oct; under loose bark; on tree trunk at night; leaf litter in woods; in rotting pine log.

†!*Platynus opaculus* LeConte–(1); DM; mt; 21 Nov-5 Dec. This species has not been recorded from Maryland, North Carolina, or West Virginia. The nearest documented states are Pennsylvania (Bousquet, 2012) and South Carolina (Ciegler, 2000; one specimen). A report of this species from the Potomac River Gorge, without reference to state record status, by Evans (2008), and cited by Roble & Hoffman (2012), is based on a misidentified specimen of *P. decentis*.

*Platynus tenuicollis* (LeConte)–(27); GF, TR; hp, mt; 10 Apr-30 Jul; PRG 1912; under bark.

*Platynus cincticollis* (Say)–(23); DM, GF, TR; bl, mt, hp; 10 Apr-26 Sep; rocky non-tidal shore with sand and gravel; shore with silty sand under rock; non-tidal shore with cobble, silt, and driftwood.

## PERIGONINI

\*!◇*Perigona nigriceps* (Dejean)–(2); TR; bl; 15 Oct. This non-native species was first documented from Virginia by Hoffman & Roble (2000). This is the first record for Fairfax County.

## ATRANINI

*Atranus pubescens* (Dejean)–(1); RP; hp; 11 May; under driftwood on tidal beach with sand and cobble.

## ODACANTHINI

*Colliuris pensylvanica* (Linnaeus)–(1); GF; bs; 24 Jun.

!*Colliuris ludoviciana* (Sallé)–(1); DM; hp; 15 May; gravelly, tidal beach on *Schoenoplectus pungens*.

## CTENODACTYLINI

!*Leptotrachelus dorsalis* (Fabricius)–(9); DM; mt; 10-17 May, 16 Jul-28 Aug.

## CYCLOSOMINI

*Tetragonoderus fasciatus* (Haldeman)–(8); GF, PH, TR; bl, hp, mt; 1 May–17 Jun, 9 Sep; under leaf litter on dry sand bank along river; dry, bare sand on bank of river; tidal shore on silty sand. Small colonies of *T. fasciatus* were observed to be active during the day in mottled sunlight on dry sand banks along the river.

## LEBIINI

*Phloeoxena signata* (Dejean)–(4); GF, TR; mt; 21 May–17 Jul. This species was first reported for Virginia by Hoffman (1997) and for the Potomac River Gorge, where it reaches its northern limit, by Steiner & Erwin (2007).

*Coptodera aerata* Dejean–(10); GF, LH; lf, mt; 1 May–26 Jul; PRG 1922.

*Cymindis limbata* Dejean–(4); GF; hp, mt; 14 Apr, 31 Jul–17 Aug; PRG 1917; on shrub.

\*!*Cymindis platicollis* (Say)–(7); GF; mt; 10 Apr–20 May.

*Apenes lucidula lucidula* (Dejean)–(2); TR; bl, hp; 13 Mar, 18 Jun; in building.

\*!*Apenes sinuata* (Say)–(1); TR; bl; 18 Jun.

†!*Microlestes pusio* (LeConte)–(2); CP; hp; 20 May, 30 Aug; turf grass overhanging concrete. This minute carabid (2.4–2.7 mm) has a known range from southern Ontario, west to eastern South Dakota, and south to eastern Texas, Mississippi, and Tennessee (Bousquet, 2012). Records from the East Coast have only been documented from New York; it has also been found in Pennsylvania.

\*!*Apristus latens* (LeConte)–(1); TR; hp; 14 May; dry, sandy riverbank.

*Lebia grandis* Hentz–(1); GF; bl; 12 Jul. Evans (2008) recorded the first record for this beetle from the Potomac River Gorge since 1924 on Bear Island, Maryland.

*Lebia analis* Dejean–(2); DM, GF; bl, mt; 20 Jun, 12–26 Sep; PRG 1930.

*Lebia lobulata* LeConte–(6); AW, GF, TR; bf, bl, mt; 15 Apr–17 May, 3–17 Jul, 19 Sep–21 Oct; leaf litter in woods.

*Lebia ornata* Say–(4); GF, TR; bl, mt; 25 May–30 Jun. Evans (2008) documented the first record of this species in the Potomac River Gorge since 1913.

*Lebia viridipennis* Dejean–(22); GF, TR; bl, mt; 1 May–21 Jul. Evans (2008) reported the first record of this species in the Potomac River Gorge since 1930.

*Lebia viridis* Say–(19), DM, GF, TR; bl, hp, mt; 10 Apr–20 Jul, 3 Oct; on *Solidago bicolor* L.; on *Taraxacum officinale* Weber; attracted to light on building.

*Lebia solea* Hentz–(6); GF, TR; bl, mt; 21 May–21 Jul; PRG 1930.

*Plochionus timidus* Haldeman–(1); GF; hp; 15 Jan; PRG 1924; under loose bark of dead standing *Quercus coccinea* Münchhausen.

*Calleida viridipennis* (Say)–(5); GF, TR; bl, mt; 1–22 May, 21 Jul.

## GALERITINI

*Galerita bicolor* (Drury)–(9); GF, RI, TR; bf, hp, mt, pf; 24 Mar–4 Aug; under bark of fallen log; inside loose wood of rotting log; leaf litter in woods.

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female specimen of *Notiobia nitidipennis*.

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